

Claims

1      1. A device, comprising:  
2      a means for performing metal organic vapor phase epitaxy (MOVPE) on a surface  
3      of a substrate; and  
4      a means for performing hydride vapor phase epitaxy (HVPE) on the surface of the  
5      substrate.

1      2. The device according to claim 40, wherein said device can transition from  
2      MOVPE to HVPE *in situ*.

1      3. The device according to claim 41, wherein the substrate does not have to be  
2      removed from the device between MOVPE and HVPE.

1      4. The device according to claim 42, wherein the substrate can be maintained at  
2      elevated temperatures during transition from MOVPE to HVPE.

1      5. The device according to claim 41, wherein said device can also transition from  
2      HVPE to MOVPE *in situ*.

1      6. The device according to claim 44, wherein said device can also transition from  
2      HVPE to MOVPE *in situ*.

1      7. The device according to claim 45, wherein the substrate can be maintained at  
2      elevated temperatures during transition from HVPE to MOVPE.

1      8. The device according to claim 40, wherein said device can be used to grow a  
2      III-V nitride compound semiconductor onto the surface of the substrate.

1       9. The device according to claim 47, wherein said device can be used to grow GaN  
2       onto the surface of the substrate.

1       10. The device according to claim 48, wherein said means for performing HVPE  
2       comprises a hot wall reactor having a source zone, and  
3       a downstream mixing zone,

4       wherein TMG can be reacted with HCl in the source zone to form a chlorinated  
5       gallium species, and wherein the chlorinated gallium species can combine with NH<sub>3</sub> in the  
6       downstream mixing zone and directed toward the substrate for deposition of GaN onto the  
7       substrate.

1       11. The device according to claim 48, wherein said means for performing MOVPE  
2       comprises a low pressure horizontal/cold-wall MOCVD reactor.